

Availability Pattern of ABO and Rh Blood Bags in Private and Public Sectors Blood Banks

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Abstract

Background: Blood transfusion is a life saving phenomenon which has a very key role in the patient's management and an important component of health care delivery. It is therefore very important that blood banks within health facilities must have store blood bags for all blood groups in order to handle emergencies.

Objective: To determine the availability pattern of ABO and Rh blood groups in blood banks of private and public sector hospitals of two major cities of Pakistan.

Study design, settings and duration: A descriptive cross sectional study was carried out in blood banks of private and public sector hospitals of Lahore and Peshawar from January to December 2016.

Material and Methods: After taking written consent from the In-charge blood bank/hospital, a predesigned questionnaire was filled from 4 public sector and 4 private sector blood banks of tertiary care hospitals of two major cities Lahore and Peshawar. The gathered information was regarding blood bag types and history of donor. Similarly, information of 422 blood bags was gathered on a structured proforma from private and public sector hospitals collectively. Data was entered and analyzed by using SPSS version 16.

Results: Out of 422 blood bags, 90.8% Rh positive and 9.2% Rh negative blood bags were available collectively in both private and public sector hospitals. Blood donation trend were found high among males (75.6%) than females (24.4%) and availability of Rh negative blood bags was high among male donors (7.5%) than female (1.7%). Availability of B positive blood was high in private sectors hospitals (18.5) while O positive blood was high in public sector hospitals (19.4%). Availability of AB negative and A negative was very low (less than 1%). Blood donation trend was high among age group 18-30 years (46%). Aged people having age >60 years mostly donated blood Rh negative (1%). Blood donation trend decreased with increasing age 46% for age 18-30 years and 13.5% for age group 51-60 years.

Conclusion: Availability of ABO and Rh blood bags in private and public hospital blood banks of Lahore and Peshawar cities were similar. Availability of Rh negative blood bags was relatively very low. Mass awareness program are needed to encourage Rh negative blood donors toward blood donation. Females and seniors should be encouraged toward blood donation, so that we can meet over the emergencies in hospitals.

Key words: Availability, ABO blood group, blood banks, transfusion, Rh negative, blood donation.

Introduction

Blood is the most essential entity of human life and there is no substitute for it.¹ In medical

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AK did conceptualization of study design, data collection & write up. OU did the proof reading and data interpretation. GL also performed study design & write up. HZ did the data collection and write up. Data analysis & data collection have done by AA.

practices, it is the most widely donated tissue and is only produced by human themselves. Thus making the "blood donation" the only way to acquire blood in emergencies² and saving the lives of number of people around whole world. If safe and sufficient blood is supplied in time, then up to one quarter of maternal deaths can be prevented each year.³ Road traffic accidents kill almost 1.2 million people and 90% of them requires blood transfusion within first 24 hours of their accident but most of them don't get supply of blood on time due to the shortage of blood units.⁴ About 300,000 infants worldwide born annually with thalassaemia and sickle cell anemia across the world and need a regular supply of blood transfusion.⁵

In 17th century, the process of blood transfusion started and it was first transfused from a dog to dog⁶ and with the development of serological

compatibility techniques, the transfusion from human to human got accomplished. The concept and idea of preservation of blood and establishment of blood banks arose during second World War.⁷ The demand of blood is increasing day by day and its availability still remains short to meet these demands regardless of efforts and number of awareness programs that are organized worldwide.¹ According to WHO (World Health Organization), in order to maintain blood's stock and products of a country at an acceptable level, the ideal rate of blood donation per year should be 3-5%.⁸ WHO estimated that if only 1% of world population donates blood on a regular level, then it will be sufficient to meet the world's minimum requirements, however this required percentage is higher in developed countries having more advanced technologies, requiring more blood than the normal amount. The low-income and lower middle-income groups countries provided 2% and 22% of the global donations respectively.⁹

Blood donors are categorized into three classes that includes volunteer donors and replacement donors¹⁰ and the trend of donating blood is less in volunteer donors as compared to other class.¹ Blood donation is not only important for saving lives but also for maintenance of a better social and healthy environment. For safe and sufficient blood supply, voluntary and non paid blood donation should be promoted and exercised.¹¹

Worldwide around 80 million unit of blood are annually donated. In Pakistan, it has been estimated that 3.5 million blood donations are collected every year.¹¹ Two percent of the population of any country which donates blood regularly can meet the needs of their entire population, but the culture of blood donation in Pakistan is yet to take root.¹² A study conducted in Rahim Yar Khan district of Pakistan provided that blood group B is at the highest frequency level among both the genders with an overall higher to lower order B (37.41%), O (33.95%), A (20.97%), and AB (7.65%). It was found that in male subjects, the blood group B was also at the highest frequency in Rh+ve as well as Rh-ve. In female subjects, the blood group O (33%) was at the highest frequency in Rh+ve and blood group A was at peak in Rh-ve.¹³ Another study conducted by MN Khan et al in Azad Jammu Kashmir in 2009 concluded the prevalence of blood group O and B is more or less equal and also has the greatest frequency among the other blood groups, sometimes frequency of blood group O is more, followed by B then A and the least frequent is blood group AB.¹⁴

The availability of blood bags in blood banks of these two major cities are the prime need to address the issues of blood donation as major accidents in term of terrorism, natural and manmade disasters happened usually in crowded population. Therefore, it is needed to provide information regarding the availability, preparation and strategies to overcome the requirements to cope with any kind of disasters.

Materials and Methods

This cross sectional descriptive study was carried out in four tertiary care public and private sector hospitals respectively in Lahore and Peshawar, Pakistan from January to December 2016. Tertiary care hospitals of two big cities were selected as large number of emergencies has been handled in tertiary care hospitals. Informed written consent was taken from the medical superintendent (MS) or Blood bank Incharge and predesigned questionnaire containing information regarding blood group, blood donor age, gender etc were filled. Data of all available blood bags of each selected blood banks of tertiary care public and private hospitals were gathered. Samples were collected by convenient sampling technique and included all stored blood bags of respective blood banks. Pakistan Health Research Council trained staffs were deputed to collect data. Data was entered and analyzed by using SPSS version 16.

Results

Out of 422 blood bags, data of 212 were collected from Lahore and data of 210 from Peshawar. Among these selected blood bags, 90.8% Rh positive and 9.2% Rh negative (Table-1) that were available collectively in both private and public sector hospitals.

Blood donation trend were found high among male (75.6%) than female (24.4%) and availability of

Table 1: Availability of ABO & RH blood bags in blood banks of major cities of Pakistan.

Blood Group Type	Frequency of Rh Positive n (%)	Frequency of Rh negative n (%)
A	79 (18.7)	5 (1.2)
B	128 (30.3)	10 (2.3)
AB	46 (11)	5 (1.2)
O	130 (30.8)	19 (4.5)
Sub Total	383 (90.8)	39 (9.2)
Total	422	

Table 2: Genders trend toward blood donation.

Gender	Blood Group (%)								Total
	A		B		AB		O		
	Rh +ve N (%)	Rh -ve N (%)	Rh +ve N (%)	Rh -ve N (%)	Rh +ve N (%)	Rh -ve N (%)	Rh +ve N (%)	Rh -ve N (%)	
Male	69 (16.3)	2 (0.5)	79 (18.7)	6 (1.4)	18 (4.2)	3 (0.7)	128 (30.3)	14 (3.3)	319 (75.6)
Female	17 (4)	0 (0)	37 (8.7)	1 (0.2)	17 (4)	0 (0)	25 (6)	6 (1.4)	103 (24.4)
Sub total	86 (20.3)	2 (0.5)	116 (27.4)	7 (1.6)	35 (8.3)	3 (0.7)	153 (36.2)	20 (4.7)	
Total	88 (20.8)		123 (29)		38 (9)		173 (41)		422

Table 3: Comparisons of different groups blood bags availability in public and private sectors hospitals.

Hospital Category	Blood Group (%)								Total
	A		B		AB		O		
	Rh + N (%)	Rh – N (%)	Rh + N (%)	Rh – N (%)	Rh + N (%)	Rh – N (%)	Rh + N (%)	Rh – N (%)	
Government sector hospitals	44 (10.4)	4 (1)	50 (11.8)	4 (1)	10 (2.3)	2 (0.5)	82 (19.4)	9 (2.1)	205 (48.6)
Private sector hospitals	35 (8.3)	1 (0.2)	78 (18.5)	6 (1.4)	36 (8.5)	3 (0.7)	48 (11.3)	10 (2.3)	217 (51.4)
Sub total	79 (18.7)	5 (1.2)	128 (30.3)	10 (2.3)	46 (11)	5 (1.2)	130 (30.8)	19 (4.5)	
Total	84 (20)		138 (32.7)		51 (12)		149 (35.3)		422

Table 4: Trends of blood donation among different age group.

Age Range (Years)	Blood Group								Total
	A		B		AB		O		
	Rh +ve N (%)	Rh -ve N (%)	Rh +ve N (%)	Rh -ve N (%)	Rh+ve N (%)	Rh -ve N (%)	Rh +ve N (%)	Rh -ve N (%)	
18-30	44 (10.4)	0 (0)	49 (11.6)	3 (0.7)	7 (1.6)	0 (0)	88 (20.8)	3 (0.7)	194 (46)
31-40	17 (4)	0 (0)	33 (7.8)	2 (0.5)	12 (2.8)	2 (0.5)	27 (6.4)	6 (1.4)	99 (23.4)
41-50	14 (3.3)	0 (0)	19 (4.5)	0 (0)	10 (2.3)	1 (0.2)	15 (3.5)	3 (0.7)	62 (14.7)
51-60	11 (2.6)	1 (0.2)	15 (3.5)	2 (0.5)	6 (1.4)	0 (0)	17 (4)	5 (1.2)	57 (13.5)
>60	0 (0)	1 (0.2)	0 (0)	0 (0)	0 (0)	0 (0)	6 (1.4)	3 (0.7)	10 (2.4)

Rh negative blood bags was high among male donors (7.5%) than female (1.7%) (Table-2). More abundant blood group was O +ve (36.2%) and the most rare blood bag was A -ve (0.5%). Availability of B +ve blood was high in private sectors hospitals (18.5%) while O +ve blood was high in public sector hospitals (19.4%). Availability of AB negative and A negative was very low (less than 1%) (Table-3). Blood donation trend was high among age group 18-30 years (46%). About 2.4% aged people age > 60 years donated blood mostly Rh negative (1%). Blood donation trend decreased with increasing age 46% for age 18-30 years and 13.5% for age group 51-60 years (Table-4).

Discussion

The study was carried out in public and private sector hospital blood banks of two major cities of Pakistan for determination of different blood bags availability. The major cities of Pakistan are in high security alert states due to terrorism and other accidents. The availability of blood in emergency

situations is much needed and is considered life safety. The importance of the availability of each group of blood in blood banks cannot be ruled out. Rh positive blood bags frequency was in 90.8% in present study similar pattern of an Indian study¹⁵ where Rh positivity was 94.2% and a Pakistani study 90.9%.¹⁶ D antigen distributions are consistent globally and are in similar pattern of distribution across the globe.¹⁷ Blood donation trend is dominant among male blood donors and recent study 75.6% blood donors were male. It had been observed that blood donation trend is high among male being a healthy and less risk group for infection than female.¹⁷⁻¹⁹

Blood bags with O +Ve and B +Ve blood bags were in large numbers (36.2% and 27.4% respectively) than other blood bags. The pattern is similar to that of study conducted among blood donors in twin cities of Pakistan.²⁰ The study provided that availability of negative blood was very rare in blood banks in spite of large emergencies happening in large cities of Pakistan. Rh negative blood are rarely found in all other studies and most

studies reported that AB negative blood is very rare.²¹⁻²³ The most frequently available blood was B +ve and O +ve and similar was found in studies conducted in Asian pacific where it was found that distribution of ABO blood bags was found even in all blood banks but many blood banks lacks facilities to properly stored blood bags. Many blood banks were noticed to have links with professional blood donors and lack the quality assurance and transfusion policy.^{20,22,23} This study provided that Public sector blood banks do not have sufficient availability of all kind of blood for emergencies and Rh negative blood was very rare in all types of blood banks.

In conclusion, we can say that Rh negative blood was rarely found in public and private sector blood banks of two large cities of Pakistan. Big cities should have all kind of stored blood bags in blood banks in order to meet the requirement of emergency situations as these cities are in high alert security risk condition. Massive campaign and public awareness is needed to encourage all Rh negative blood donors toward charity blood donation.

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